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IN

# AGRICULTURAL ENGINEERING

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## Agricultural Engineering.

Activities of the Bureau of Agricultural Engineering. By Harry F. Blaney. California Citrograph. v.17, no.1. November, 1931. p.6, 30.

Farmer and the college: report of the Extension Service. 1932. 68 p. Missouri College of Agriculture, Extension Service Circular no.285. Agricultural Engineering, p.37-40 - Land conservation, farm structures, silo construction, electricity on Missouri farms.

## Agriculture.

Agriculture leads the way on the road to profits. By H. G. Murphy. Implement Record. v.29, no.4. April, 1932. p.17-18.

Current viewpoints on agriculture: Editorial. Agricultural Engineering. v.13, no.4. April, 1932. p.113. Smallness or greatness of organizational changes necessary to put agriculture on its feet will influence agricultural engineering in detail rather than in principle.

Facing the facts: Editorial. Montana Farmer. v.19, no.15. April 1, 1932. p.6. Discussion of corporation farming.

Farm-management problems in shifting from sack to bulk handling of grain in the Pacific Northwest. By Neil W. Johnson, E. F. Landerholm, G. W. Kuhlman, and T. L. Gaston. 1932. 40p. U. S. Dept. of Agriculture. Technical bulletin No. 287.

Farmers, look ahead! By Arthur M. Hyde. The Missouri Ruralist. v.73, no.17. March 1, 1932. p.1. For agriculture, way to get out and stay out of depression is to control production to such volume as market will consistently take at a profit. To do this there must be (1) such organizations of farmers as can plan and enforce that control, (2) tariff which holds home market for American farmers, and (3) national land policy so planned and administered as to reorganize and adjust land use in light of modern economic conditions, and to prevent further unwise expansion of our national farming plant.

## Agriculture.

(Cont'd.)

Industrial development to aid agriculture. By A. L. Ward. Farm  
and Ranch. v.51, no.5. March 1, 1932. p. 10,14.

Prosperity hangs in the balance. By Arthur M. Hyde. Country Home.  
v.56, no.2. February, 1932. p.7-9, 32-33. Organization is  
keynote - to end that there shall be here in America one standard  
for all. Agriculture enters into unequal battle only with its bare  
hands and divided strength of individual farmers. But agriculture  
at last is moving toward unified conquest of its differences and  
unified expression of its demands.

Using our abandoned farms. By Richard Lieber. 1930. 11p.  
Reprint from National Republic. v.18, no.1. May 1930.

## Air conditioning.

Air conditioning. By William Hull Stangle. Pt.XVIII - Condenser  
water for refrigeration. By Realto E. Cherne. Heating and Ven-  
tilating. v.29, no.4. April 1932. p.47-53.

Humidification for residences. By Alonzo P. Kratz. 1931. 30p.  
Illinois Engineering Experiment Station Bulletin No. 230. Humidity  
requirements; limitations on relative humidity; performance of water  
pans; measurement of relative humidity; method of calculation for  
curves of humidity requirements and limitations.

Summer air conditioning of residences: use of capillary attraction  
and gas heat energy. By Eugene D. Milener. Refrigerating En-  
gineering. v.23, no.3. March 1932. p.147-154.

## Cotton.

Better ginning and improved preparation. By Charles A. Bennett.  
Cotton and Cotton Oil News. v.33, no.18. April 30, 1932.  
p.12-14. Discussion of effect of different ginning methods on  
preparation of cotton.

Cotton improvement through type selection, with special reference to  
the Acala variety. By O. F. Cook. 1932. 62p. U. S. Dept.  
of Agriculture. Technical Bulletin No. 302.

Drying and ginning cotton. By Charles A. Bennett. Oil Miller  
and Cotton Ginner. v.40, no.1. March 1932. p.8-10.  
v.40, no.2. April 1932. p.8 - 10.

Light gas engines for gin power show economy. By L. L. Machia .  
Oil Miller and Cotton Ginner. v.40, no.1. March 1932.  
p.11,16-17. Table gives operating data on ten climax cotton gin  
engines.

Cotton. (Cont'd.)

MeyerCORD cotton picker. Farm Implement News. v.53, no.17.  
April 28, 1932. p.12-14. After years of testing, success is  
claimed for mechanical picking by virtue of getting cotton, avoiding  
damage to immature bolls and solving vine problem.

Power problem dominates convention of Texas ginner. By Orville  
Adams. Cotton and Cotton Oil News. v.33, no.18. April 30,  
1932. p.5,9. Survey shows power cost varying from 24 cents  
with engines to \$1.15 with electric power, with average of 76 cents  
per bale.

Seed cotton driers. Farm Implement News. v.53, no.14. April 7,  
1932. p.27. Horizontal type and vertical type developed by  
U. S. Department of Agriculture. Adapted to all of existing suc-  
cessful cotton drying equipment.

Something new in ginning machinery. Cotton Ginners' Journal,  
v.3, no.7. April 1932. p.18. New machine is called Gullett  
Rotary Air Line Cleaner-Separator. Cotton goes into this machine  
in any volume desired, passes through it in unimpeded manner and is  
delivered out of separator in constant "bat", which may be thin or  
thick, depending upon volume of cotton fed through it. Automatic  
valve predetermines thickness of "bat" and no manual operations are  
required at all as machine is fully automatic in every particular.  
It has built into it as an integral part an air line cleaner feature.

Truth about cotton. By E. V. Wilcox. Country Gentleman. p.102,  
no.2. February 1932. p.16-17.

Use of machinery in cotton production. By John W. Randolph.  
Agricultural Engineering. v.13, no.4. April 1932. p.99-100.  
Impossible to make general recommendations as to best machinery for  
cotton production on farms of different sizes and with varying soil  
and topography.

Dams.

Earthfill dam saved from destruction by cutting through side embankment.  
Engineering News Record. v.108, no.15. April 14, 1932. p.561-  
562. Undercutting of spillway paving during flood threatens dam,  
and highway bridge.

Model tests confirm design of Hoover Dam. By J. L. Savage and  
Ivan E. Houk. Engineering News Record. v.108, no.14.  
April 7, 1932. p.494-499. Editorial, p.492-493. Deflections  
and strains of plaster-celite model under mercury loading measured  
with high precision. Results confirm design analysis closely.

Dams. (Cont'd.)

Tale of construction marvels at Hoover Dam. Engineering News Record. v.108, no.16. April 21, 1932. p.570-574. City of 5,000 built and populated, construction plant whose capacity is recorded in thousands of units per day, and railway and highway system created in twelve months on desert plateaus and in rocky canyons. Editorial, p.567.

Waste in economy: Editorial. Engineering News Record. v.108, no.18. May 5, 1932. p.640-641. Hoover Dam construction appropriation cut. Can continue working only four or five months at best.

Uplift under dams: Letter from Homer M. Hadley. Engineering News Record. v.108, no.17. April 28, 1932. p.629-630. Discussion of article by C. V. Davis and C. H. Powell.

Drainage.

Ditch maintenance. Agricultural Engineering. v.13, no.4. April 1932. p.107. From a paper on "Present Needs in Drainage Work," by Lewis A. Jones, presented before the National Drainage Conservation and Flood Control Congress at Louisville, Ky. February, 1932.

Drain tile manufactured in Ohio. By J. Otis Everhart. 1929. 85p. Ohio Engineering Experiment Station. Bulletin No. 51.

Drainage and overproduction: Editorial. Agricultural Engineering. v.13, no.4. April, 1932. p.112. Drainage covers two separate and distinct types of economic and social development. One is exercise or exploitation of real or imagined new opportunities. Other is for individual already committed to farming, to particular community and probably to particular farm, by experience, abilities, preferences, hopes, home ties, activities in progress, frozen investments and other social and economic frictions which prevent him from answering calls to new and different opportunities. It helps him to make best of situation which he is in no position to change; to adapt his farming to latest knowledge of crop requirements, efficient production equipment, and market demand for high quality at low cost.

Drainage in Porto Rico. By M. L. Vicente. Facts about Sugar. v.27, no.3. March 1932. p.98-99. Open ditches used. Cost of tile drainage prohibitive except in vicinity of towns.

Land drainage. By W. L. Powers and T. A. H. Teeter. 2d ed. N.Y., John Wiley and Sons, Inc., 1932. 353p.

## Land drainage

(Cont'd.)

To test drain tile installation. Brick and Clay Record. v.80, no.4. April 1932. p.204. Tract consists of marsh land and well is being drilled to feed water back to soil through tile which will also be used to drain plot in times of excessive rainfall.

A \$295,000 lesson: Reflooding of Thief Lake starts Minnesota's march down hill from disastrous ditch craze that left desert. American Game. v.20, no.6. November-December, 1931. p.88-89. Stumbling block of whole matter was fact that drainage laws of Minnesota were such that when judicial ditch system was once established there was no procedure whereby water levels could be interfered with by building dams or dikes.

## Electricity on the farm.

Developments in rural electrification. By Geo. W. Kable. Manufacturers Record. v.101, no.14. April 7, 1932. p.30-32. Adopting new types of power; farm electric service; electric hay-drier; electric hot-beds; light in agriculture; manufacturers' interest in rural electrification.

Electric "chair" for insects hauled through fields. Popular Mechanics. v.56, no.4. October 1931. p.641. Insect destroyer consists of system of wires running parallel on wooden frame and connected to battery with step-up coils to increase voltage. Wire frame was mounted on front of automobile or tractor.

Electric energy in rural areas: Editorial. New England Homestead. v.104, no.13. March 26, 1932. p.5. Discussion of first rural electrification institute held in New England.

Electric guide for tractors takes operator's job. Popular Mechanics. v.56, no.4. October 1931. p.561. Farmer makes first furrow, guide wheel does rest. One man can keep several tractors in operation at one time.

Electric motors for farm applications. By B. W. Faber. Agricultural Engineering. v.13, no.4. April, 1932. p.105-107. Characteristics of single-phase motors. Characteristics of poly-phase motors.

Electric ploughing: Progress made in electric ploughing on Continent demands further consideration as to its application to work on our own land. Rural Electrification and Electro Farming. v.7, no.82. March, 1932. p.300-302. Table gives comparative costs of ploughing: steam, tractor, horse - 1925; electric - 1924.

Electricity on the farm.

(Cont'd.)

Electric soil sterilization. By Lawrence B. Carney. Agricultural Engineering. v.13, no.4. April, 1932. p.95-96. No reason why comparative results should not be obtained with plant disease, if similar fundamental principles are applied. Several improvements to be made in design before electric sterilizer can be put in commercial production are as follows:

1. Dimensions should be changed to adapt unit for moving through ordinary greenhouse doors.
2. Spacing of heating elements should be such that whole soil mass rises more uniformly in temperature.
3. Insulation against heat loss should be of a more permanent nature, free from effects of moisture and mechanical injury.
4. There would be some advantage in so making apparatus that it could be tipped on its axis to facilitate dumping, as well as loading, from top.
5. Boiler plate construction is expensive and heavy. Wood might well be considered as possibly better material for purpose.
6. Thermostat or indicating thermometer would be of great service to user.

Electricity on the farm. (A partial list of references.) Compiled by Dorothy W. Graf. 1932. 3lp. mimeographed. U. S. Bureau of Agricultural Engineering.

Growth of rural electrification. Manufacturers Record. v.101, no.14. April 7, 1932. p.26. Result of survey by Statistical Research Department of National Electric Light Association.

Hot water saves time and labor in the dairy. By J. P. Schaenzer and C. C. Bell. Electricity on the Farm. v.5, no.3. March, 1932. p.8-12.

Insect control by electricity. Electricity on the Farm. Merchandising supplement. v.5, no.3. March, 1932. p.S5-S10.

Opportunities to sell electric equipment for farms. By J. C. Scott. Implement Record. v.29, no.5. May 1932. p.12-13.

Progress report of investigations of various uses of electricity on the farms of Washington for the year 1931. Submitted January 4, 1932 to Washington Committee on the Relation of Electricity to Agriculture by L. H. Smith and Harry L. Garver. 1932. 33 p. multigraphed. Discusses influence of ultra-violet light on milk production, carbon lamp brooder tests, grain elevating, irrigation, apple washing, soil heating.

Electricity on the farm. (Cont'd.)

Research in farm electrification. By George W. Kable. Agricultural Engineering. v.13, no.4. April, 1932. p.91-94. Electric tractors; hay driers; effect of light on plant growth; soil heating; water heaters and sterilizers; rotolactor and milking combine; refrigeration and mechanical heating; should research be continued?

Sell the home, not the appliance. Electrical World. v.99, no.16. April 16, 1932. p.688-691.

Erosion control.

"Going straight" doesn't help avoid soil erosion. Utah Farmer. v.25, no.16. March 25, 1932. p.9. Straight row down slope really gives soil erosion start. To correct erosion conditions, new cultivating machine has been developed which leaves field in "pitted" condition. Shovels of machine alternately go up and down and each "pit" dug by shovels holds about 3 gallons of water. This allows water to soak into ground, rather than run off.

Method of studying soil erosion. By M. L. Nichols and H. D. Sexton. Agricultural Engineering. v.13, no.4. April, 1932. p.101-103. Preliminary results obtained with methods and equipment used indicate:

1. That rate of rainfall is one of most important factors in amount of erosion.
2. That variations in rate of natural rainfall are sufficient to materially change amount and kind of material eroded.
3. That degree of saturation of soil at time of beginning of precipitation materially effects erosion.
4. Erosion is materially reduced by contoured rows.
5. Heavy growth of vetch practically eliminated erosion on slopes up to 10 per cent during one inch of rain applied in 8 $\frac{1}{2}$  minutes.
6. Plowing land materially increases erosion once land becomes saturated.
7. Erosion varied uniformly with slope up to about 12 per cent grade. Above this slope, rate of erosion increased very rapidly.
8. Surface cultivation materially increases erosion when rate of rainfall is high, and decreases erosion when rate is low.

Problem of soil erosion. Farm Implement News. v.53, no.15. April 14, 1932. p.15. Digest of talk of H. H. Bennett. Control of erosion problem is matter of correct land usage and correct land protection.

Serious erosion caused by heavy rain of July 30, 1931, near Colfax, Washington. By W. A. Roekie. Monthly Weather Review. v.60, no.1. January 1932. p.22-23. Vegetative growth is most effective control of soil washing and of run-off moisture losses.

## Erosion control.

(Cont'd.)

Soil erosion threatens U. S. with barrenness of China. Popular Mechanics. v.57, no.1. January, 1932. p.15. According to Lewis Radcliffe, of Commerce Department, rainfall is washing away in one to seven years same quantity of soil which nature takes 400 years to build.

Strip cropping to prevent erosion. By H. V. Geib. Farm and Ranch. v.51, no.7. April 1, 1932. p.24.

## Evaporation.

Evaporation from lakes and reservoirs. By C. E. Grunsky. Monthly Weather Review. v.60, no.1. January, 1932. p.2-6.

## Extension.

An extension program in farm machinery. By J. T. McAlister. Agricultural Engineering. v.13, no.4. April, 1932. p.104. Agricultural extension service of Clemson Agricultural College.

How effective is County Agent work? By R. R. Thomasson. Extension Service Review. v.3, no.4. April, 1932. p.57-58. Study of conditions made in two Missouri counties.

Some results of extension work in 1931. 1932. 30p. Virginia Agricultural and Mechanical College. Extension division Bulletin No. 127. Agricultural Engineering; p.25-26.

What shall the Extension worker study? By C. B. Smith. Extension Service Review. v.3, no.4. April, 1932. p.49-50. Learning about teaching; using teaching aids; correspondence courses.

## Farm buildings.

Clean up and repair of the home and community. By Madonna Fitzgerald and others. 1932. 8p. Oklahoma Agricultural and Mechanical College. Extension Service Circular No. 290.

Cobblestone: Why not convert the native rock of New England into buildings? By W. H. McPheters. New England Homestead. v.104, no.11. March 12, 1932. p.4,11-12.

Construction of cow-houses. London, H. M. Stationery Office. 1931. 22p. Gt. Britain, Ministry of Agriculture and Fisheries. Bulletin No. 40.

Farm buildings. (Cont'd.)

Farm building plan service: Editorial. Agricultural Engineering. v.13, no.4. April, 1932. p.112. Details of project are being worked out and are expected to be ready to submit to consideration by Structures Division during or before A.S.A.E. annual meeting at Columbus, Ohio, June 20 to 23.

Live-stock loader has an adjustable floor. Popular Mechanics. v.57, no.3. March, 1932. p.512. Platform of 2-inch plank-ing, laying boards lengthwise, and then nail cleats across top surface to prevent stock from slipping. Posts are 3 by 6 inch planks set in concrete, vertical row of holes being drilled in front and center posts to receive lengths of heavy pipe, which support platform at various heights. Two front posts are also drilled to take winding crank, made of heavy iron rod and bent as shown. In use platform is adjusted to desired height by turning crank, and pipes are then inserted in proper holes to support it in this position.

Model milking shed. By Oliver Constable. Hoards Dairyman. v.77, no.3. February 10, 1932. p.74.

Safety bull pen plans. By Richard F. Talbot. Maine University Extension Service. Circular No. 108. 1932. 4p.

Farm machinery and equipment.

B.M.E.P. yardstick for measuring engine performance. Farm Implement News. v.53, no.18. May 5, 1932. p.18-19. Brake mean effective pressure is much better gauge of performance than actual power developed, for latter depends upon R.P.M. of engine, and test speed may, and often is, beyond conservative safe operating speed of particular engine.

Caring for farm machinery. By C. V. Englund. Farm Machinery and Equipment. No.1779. March 15, 1932. p.9.

Diversifying means more tools. By E. T. Leavitt. Implement and Tractor Trade Journal. v. 47, no.8. April 9, 1932. p.10. Cultivating equipment especially will be in greater demand. Cost is offset by saving in labor and increases in yield.

Farm machinery or farm labor? Implement and Tractor Trade Journal. v.47, no.10. May 7, 1932. p.13. Buying equipment instead of hiring help will create added employment and increase market for farm products.

Farm machinery and equipment. (Cont'd.)

- Farm machinery prices. Market Growers' Journal. v.50, no.8. April 15, 1932. p.201. Farm machinery cheaper now than for many years to come. Priced according to weight. Heavier machines demanded and do more and better work.
- Farm machinery should be sheltered. Building Material Digest. March, 1932. p.24-25. Table gives floor space necessary for common farm machines.
- Farm profits come from savings made by modern equipment. Implement Record. v.29, no.5. May, 1932. p.14. Equipment purchased at this time by efficient producer will prove investment rather than expense.
- Flexible weed-mowing unit operates from truck. Popular Mechanics. v.57, no.1. January, 1932. p.12. Cutter consists of power-driven sickle with cutter bar attached to steel frame which carries motor, all mounted on pneumatic-tired wheels on tandem. Telescope pipe permits sickle unit to be operated near or several feet from truck, cutter running in grass while truck travels on highway.
- Gas-engine troubles you can cure. By James R. Ward. Popular Mechanics. v.57, no.3. March, 1932. p.515.
- Grinding costs on small grinders. Grain and Feed Journals. v.68, no.4. February 24, 1932. p.200. Table gives cost of grinding per 100 lbs. Comparing costs put out by Kansas, Ohio, Iowa, and Nebraska, it is found that total grinding costs for shelled corn and wheat vary from 3¢ to 8¢ per bushel, oats almost double these costs and roughage, like corn fodder, show costs from \$1.25 to \$3 per ton. Of these totals about one-half are labor and power charges and the other half includes interest, depreciation, housing, insurance and taxes, and repairs. Summary of data from the four states mentioned indicates that between 11 and 12 per cent of original investment must be allotted to interest, depreciation and housing, and that repairs amount to about 1.5 per cent.
- How to fit pruning shears. By L. M. Roehl. Electricity on the Farm. v.5, no.3. March, 1932. p.15-17.
- Implement dealer and farm cost accounting. By E. T. Leavitt. Farm Implement News. v.53, no.18. May 5, 1932. p.16-17.
- Indiana farmers profit by grinding wheat. By J. M. Pearce. Electricity on the Farm. v.5, no.4. April, 1932. p.13-16. Uses little hired help. Grinding at low cost.

Junk the junk and disarm the critics. The Western Farm Live.  
v.34, no.6. March 15, 1932. p.3,11. Farmers have much  
to gain and nothing to lose by junking old, wornout machines and  
providing suitable housing facilities for equipment in use.

Low cost crop production. By M. E. Towne. American Thresher-  
man. v.35, no.4. April 1932. p.4-5. Labor and power  
offer biggest opportunity to lower present high average cost of  
producing crop.

M-M offers 2-in-1 equipment. Implement and Tractor Trade Journal.  
v.47, no.9. April 23, 1932. p.14,16. New cultivator  
for use with Universal tractor with few additions becomes  
practical four-row planter.

Machinery company guarantees price of farm products: Editorial.  
Utah Farmer. v.25, no.18. April 25, 1932. p.6. Inter-  
national Harvester Co. believes farmers have been reluctant to  
buy implements needed for economical production and harvesting  
of crops, because of unsatisfactory prices of commodities.  
\$.70 a bushel for no. 2 hard wheat (Chicago) \$.50 a bushel for  
no. 2 yellow corn (Chicago) and \$.08 $\frac{1}{2}$  a pound for middling  
cotton (New Orleans).

Machine has been libeled: Some facts about the relation between  
machine and unemployment for those who long for the "good old  
days". By John H. VanDeventer. Printers' Ink. v.158,  
no.3. January 21, 1932. p.73-76..

No saturation of farm machinery: Editorial. Implement Record.  
v.29, no.4. April, 1932. p.15. As long as some farmers  
expend three times amount of labor in producing crops as that  
required by their more efficient neighbors there is still deserv-  
ing place for more farm machinery.

Obsolete farm machinery delays return to prosperity. By F. A. Wirt.  
Implement Record. v.29, no.5. May 1932. p.15-16.

Protect farm machinery. California Cultivator. v.78, no.12.  
March 19, 1932. p.283. Housing - oiling - cleaning.

Sell hay machines for lower feeding costs. By E. T. Leavitt.  
Farm Implement News. v.53, no.17. April 28, 1932. p.15.  
Methods and equipment which make it possible to speed operations,  
while conditions are favorable, are important.

Servicing power farming equipment. By Owen C. Jones. Farm  
Implement News. v.53, no.18. May 5, 1932. p.20-21.  
Important part played by shop that is equipped with welding  
apparatus.

Farm machinery and equipment. (Cont'd.)

Significant facts about farm equipment. By E. T. Leavitt. Farm Implement News. v.53, no.14. April 7, 1932. p.22-23. Farmers as whole, spend less than 1/3 as much for these machines as they do for cash wages to hired labor; slightly more than 1/3 as much as in taxes; less than 1/2 as much as for interest; and about 1/2 as much as they spend for automobiles.

Six-speed special reduces farm hauling costs. By S. E. Houston. Tractor Farming. v.17, no.3 and 4. March-April 1932. p.9. Table gives detailed operating costs.

Something new in haymaking: chopping hay doubles mow capacity. By J. Brownlee Davidson. Successful Farming. v.30, no.5. May, 1932. p.7,46-47. Lack of adequate storage space is responsible for great waste of that actually produced and harvested. Discussion of mechanical side of hay chopping.

Sorghum topper saves grain. By John Bird, Jr. Country Gentleman. v.102, no.5. May, 1932. p.24. In operation topper heads tall sorghums and feeds heads into barge. Heads are then ricked until dry and threshed in combined harvester. Topper was built from cutterbar and platform taken from twelve-foot combine with small feeder attached. To this was added another longer feeder taken from old wheat header. Platform was lifted by removing platform brackets from their axle, turning them up to height desired and resetting in this position. Power to drive platform canvas, two extension feeders, sickle and reel was taken from tractor by power take-off. Homemade machine was entirely successful.

2-horse vs. 1-horse machines in South Carolina. Farm Implement News. v.53, no.15. April 14, 1932. p.15. Average cost of \$18.12 an acre for all items, or 5.23 cents per pound of lint cotton. Only 34 hours of man-labor and mule-labor were required as opposed to average of 80 hours when one-horse machinery is used.

Valve adjustment on gas engines. By U. A. Patchett. Power. v.75, no.17. April 26, 1932. p.618-620. To obtain best operation from any gas engine, it is not only necessary to have correct fuel air ratio, but this mixture must be taken into cylinder, ignited, and products of combustion exhausted at proper time. Timing of these events is not same for all engines. It varies with cylinder size, shape of clearance space, compression ratio and engine speed, and should be determined by test on any particular engine.

## Farm machinery and equipment.

(Cont'd.)

Windrow combining. By Henry A. Wright. Country Gentleman. v.102, no.5. May, 1932. p.24. 'Actual use of windrowers and pick-ups under wide variety of conditions' has shown that following precautions should be observed in order to harvest your grain successfully by this method:

1. Stubble should be long enough to support windrow off ground in such way that it is easily picked up.

2. Ideal length of head and stem cut seems to be about twelve inches or more.

3. It is easier to pick up and save grain if windrow is heavy enough to knit well together without being too bulky or "ropy" for combine to thresh it steadily without choking.

4. Obviously, if windrow is to be picked up readily, it cannot be deposited in ditches, corn rows or tractor tracks where stubble has been mashed and flattened down.

5. Correct time to start windrowing is about same time you would ordinarily start with binder.

## Fences.

Cost of fencing: Editorial. Farm Implement News. v.53, no.18. May 5, 1932. p.12. Records of farm management department of University of Illinois show that annual cost of fencing averages 42 cents per acre with range of 18 cents to 95 cents.

## Fertilizer spreaders.

Lack of proper machinery may retard fertilizer scales. The Fertilizer Green Book. v.13, no.4. April, 1932. p.16. Probably greatest drawback in use of commercial fertilizer may be summed up in one statement: lack of machinery for proper application.

Let the manure spreader pay the taxes. Hoard's Dairyman. v.77, no.5. March 10, 1932. p.137. Unnecessary manure losses which may be as high as one-half of quantity produced can be saved by proper handling through frequent use of manure spreader.

## Fertilizers.

Composition and fertilizing value of sewage sludge. By G. S. Fraps. 1932. 23p. Texas Agricultural Experiment Station. Bulletin No. 445.

Recent trends in the utilization and application of fertilizers. By A. W. Blair. The Fertilizer Green Book. v.13, no.4. April, 1932. p.14-15.

Use of fertilizer in 1932. By L. R. Neel. Southern Agriculturist v.62, no.3. March, 1932. p.5.

## Flood control.

Slab-revetment equipment, Mississippi River. By Brehon Somervell.  
Engineering News Record. v.108, no.15. April 14, 1932.  
p.554-557. Editorial p.532. Special machines for bank grad-  
ing and elaborate plant for casting concrete slabs and assembling  
them on steel cables into flexible mats represent huge investment.

## Flow of water and gases.

Abfluss-Untersuchungen und Berechnungen für Überfälle an Scharfkantigen  
Wehren. By Dr. Eng. Chr. Keutner. Berlin 1931. 27p. Run-  
off investigations and calculation of flow over sharp edged weirs.

Herleitung eines neuen Berechnungsverfahrens für den Abfluss an  
Wehren aus der Geschwindigkeitsverteilung des Wassers über der  
Wehrkrone. By Christian Keutner. Berlin 1929. 8p.  
New method of calculating the flow over weirs from an analysis of  
the velocity of flow over the weir edge.

Runoff formulas and methods applied to selected Ohio streams. By  
John C. Prior. 1929. 62p. Ohio Engineering Experiment  
Station. Bulletin No. 49.

Streamflow from rainfall by unit-graph method. By L. K. Sherman.  
Engineering News Record. v.108, no.14. April 7, 1932.  
p.501-505. Editorial p.491. Observed runoff following  
isolated one-day rainfall forms basis of computation. Method  
applicable to rainfalls of any intensity or duration.

## Frost protection.

Report on tests of smoke output of oil burning orchard heaters.  
By Warren R. Schoonover. California Citrograph. v.17, no.1.  
November, 1931. p.3,48. Describes development of laboratory  
methods used in testing different makes of heaters.

## Heating.

Application of refrigeration to heating and cooling homes. By  
A. R. Stevenson, Jr., F. H. Faust, and E. W. Roessler. Domestic  
Engineering. v.138, no.6. March 19, 1932. p.33-36.

Basic laws and data of heat transmission. By W. J. King. Pt.III.  
Mechanical Engineering. v.54, no.5. May, 1932. p.347-353.  
Free convection.

Causes and control of slag formation. By James L. Corcoran.  
Power. v.75, no.18. May 3, 1932. p.651-654. Dis-  
cusses theory of slag formation, melting points of ash as deter-  
mined by its constituents, slagging in stoker and pulverized -  
coal furnaces, and usual methods of coping with problem.

Heating. (Cont'd.)

- Design of gravity-circulation water heating systems. Austin, Texas, 1926. 75p. Revised and enlarged edition of series of articles published in Heating and Ventilating Magazine. Its object is to obtain and present method of designing water heating systems which is scientifically accurate and simple.
- Heating for big home building project. By F. T. Head. Domestic Engineering. v.138, no.6. March 19, 1932. p.68-71.
- Heating in residences and small buildings. By H. L. Alt. Domestic Engineering. v.138, no.6. March 19, 1932. p.51-52, 85-86.
- Hand-fired grates and their care. By G. W. Nigh. Heating and Ventilating. v.29, no.4. April, 1932. p.37-40. Design of grates, supporting framework, connected mechanism, operation, precautions to insure long life.
- House is heated and cooled with gas. Popular Mechanics. v.57, no.1. January, 1932. p.103-105. As yet cooling equipment is not in commercial production, but it is estimated that system, by utilizing heating-plant pipes, can be produced and installed at figure well within means of owner of average-size modern home.
- How to burn Ohio coals in the home. By A. H. Dierker. 1929. 11p. Ohio Engineering Experiment Station. Circular No. 17.
- Moisture - its influence on the heat conductivity of building materials. By A. A. Berestneff. Heating and Ventilating. v.29, no.4. April, 1932. p.27-32. Heat loss coefficient studied and reported under laboratory conditions. Under field conditions high moisture content may increase, and even double heat losses as indicated by coefficients now in use.
- Natural gas versus Arkansas coal for house heating. By L. C. Price. 1932. 27p. Arkansas Engineering Experiment Station Bulletin No.11.
- New developments in radiator heating. By Norman J. Radding. American Builder and Building Age. v.52, no.6. March, 1932. p.45-47.
- Oil burner research. By Wm. W. Stevens. Domestic Engineering. v.139, no.1. April 2, 1932. p.28-30. Effect of variable fuel consumption, influence of draft and significance of CO<sub>2</sub> in oil burner operation are discussed.
- Temperature measurement - some common errors and their correction. By W. J. King. Heating and Ventilating. v.29, no.4. April, 1932. p.42-46.

### Hitches.

Care and hitches for work horses. By J. W. Burch and T. A. Ewing.  
1932. 12 p. Missouri College of Agriculture, Agricultural  
Extension Service. Circular No. 287.

### Hotbeds.

Electric germinator starts tomato plants. By George W. Kable.  
Electricity on the Farm. v.5, no.4. April, 1932. p.16,  
21. Monthly operating cost of outdoor hotbed (6 ft. by 12 ft.)  
was \$3.56.

Electric hotbed report. Market Growers Journal. v.50, no.8.  
April 15, 1932. p.194. Discussion of reports issued by  
National Rural Electric Project.

Electrically heated hotbeds. Hydro-electric power commission of  
Ontario, Bulletin. v.19, no.4. April, 1932. p.114-118.

### Houses.

Cutting cost of housing to the farmer. Washington Farmer.  
v.66, no.13. March 31, 1932. p.3.

Economical home for farm builder. By Frank P. Cartwright. Farm  
and Ranch. v.51, no.5. March 1, 1932. p.3,12.

Farm home. By F. A. Cuthbert. 1932. 56p. Oregon Agricul-  
tural Experiment Station. Bulletin No. 293. Selection of  
home site; choice of residence; landscaping the farm home; house  
and garden plans.

Large-scale housing - a need and a business. Engineering News  
Record. v.108, no.16. April 21, 1932. p.585-588. Con-  
ference of architects, buildings and housing agencies focuses  
attention upon need of housing for small-income group. Success  
depends on new methods of financing lower construction costs and  
improved materials and technique. Editorial p.568-569.

Missouri farm house plan. Better Farm Equipment and Methods.  
v.4, no.9. May, 1932. p.19.

Size of rooms in architects' 5-room houses. By Dan Scoates.  
Agricultural Engineering. v.13, no.4. April, 1932. p.108.

Steel-frame housing takes another form. Electrical World.  
v.99, no.17. April 23, 1932. p.723. Arc-welded steel-  
frame house fabricated entirely in field at cost of less than

## Houses. (Cont'd.)

\$100 more than wood framing. Nine tons of steel employed, and erection cost ran \$90 per ton as against \$120 per ton by other methods. Contractors hope to reduce this figure another \$20 per ton when shop welders become more familiar with requirements for this type of work. Structure may be termed shop-fabricated custom-built home.

What's new in house construction? American Builder and Building Age. v.52, no.6. March, 1932. p.30, 80. Latest developments in products, materials and structural units are discussed in this article summarizing report of Committee on Technological Developments of President's Conference on Home Building and Home Ownership. Editorial, p.24.

## Houses, remodeling.

From house to home in two weeks. Building Material Digest. March, 1932. p.6-7.

I turn a barn into a home. By William D. Brinckloe. Popular Mechanics. v.56, no.4. October, 1932. p.634-637. Architect tells how to remodel and judge value of house.

Unusual alteration job: Ann Dunham cottage on Martha's Vineyard is enlarged. By Samuel R. T. Very. Pencil Points. v.13, no.4. April, 1932. p.219-228.

## Hydraulics.

National hydraulic laboratory. By Herbert N. Eaton. Pt.II. Mechanical Engineering. v.54, no.5. May, 1932. p.335-340. Details of supply and measuring basins, main flume, discharge tanks, general information.

New Hydraulic design at Tiger Creek. By F. I. Lawson. Electrical World. v.99, no.14. April 2, 1932. p.608-610. Minimizing water disturbance produces high efficiency on 36,000 hp. impulse waterwheels.

Research in hydrology to be undertaken by nine committees. Engineering News Record. v.108, no.18. May 5, 1932. p.663. Committees on snow, glaciers, evaporation, absorption and transpiration, runoff, physics of soil moisture, underground water, dynamics of streams, chemistry of natural waters.

Hydraulics. (Cont'd.)

Results of tests on siphon spillways for large flume. By T. J. Corwin and A. W. Kidder. Engineering News Record. v.108, no.18. May 5, 1932. p.649-652. Close regulation of water surface in large concrete conduit on Mokelumne project is secured by siphon wasteways. Tests modify original design. Siphon primes with 0.26 ft. of overflow.

Insulation.

New insulation studies. By Herbert George. Refrigerating Engineering. v.23, no.3. March, 1932. p.155-160. 1. Heat transmission in balsam wool. 2. Porosity and infiltration of various materials in design of insulation against moisture. Scope of paper is chiefly domestic-commercial container, but much of data are general.

Irrigation.

Alfalfa in Texas. By E. A. Miller. 1932. 8p. Texas Agricultural and Mechanical College, Extension Service. Circular No.92. Discussion of irrigation of alfalfa, p.4-6.

Avocado irrigation presents problems. By H. F. Kenyon. California Cultivator. v.78, no.13. March 26, 1932. p.303. Overhead irrigation has probably been more universally adopted - gives a more uniform distribution over entire area than could be obtained by any other method. This distribution could also be obtained without excessive waste. Furrow irrigation is of course extensively used on contour plantings.

Border irrigation is demonstrated. Montana Farmer. v.19, no.16. April 15, 1932. p.8. Summary of typical irrigation demonstration.

Chilean irrigation works: letter from Carlos Hoerning. Engineering News Record. v.108, no.15. April 14, 1932. p.560.

Efficiency tests of plantation centrifugal irrigation pumps. By W. L. McCabe. Facts About Sugar. v.27, no.3. March, 1932. p.127-128. Testing motor driven pumps every four or six months recommended as insurance of maintained efficiency.

Improvements in surface overhead irrigation. California Cultivator. v.78, no.13. March 26, 1932. p.307. Movable surface overhead irrigation systems have reduced original cost of surface irrigation. Ball joint taking straight lines out of surface pipe is real practical addition.

Irrigation. (Cont'd.)

Irrigating truck crops in Alabama. By E. C. Easter. Electricity on the Farm. v.5, no.3. March, 1932. p.13-15. Fundamental requirements necessary for successful operation: 1. Ample supply of water located within reasonable distance. 2. Advice of hydraulic engineer, or buy equipment guaranteed to operate satisfactorily. 3. Study market closely. 4. Plan operation of truck patch.

Irrigation and reclamation bondholders organize. Engineering News Record. v.108, no.15. April 14, 1932. p.564. California Irrigation and Reclamation District Bondholders Association. Headquarters at San Francisco. Purpose is to protect bondholders in case of default of districts, to resist efforts to weaken irrigation and reclamation laws, to aid refinancing plans and to attempt to cure epidemic of defaults.

Moratorium assured on irrigation farms. Oregon Farmer. v.54, no.13. March 31, 1932. p.5. Delinquent construction charges for 1931 are postponed in full, but moratorium applies on only half charges for 1932. 40,354 irrigated farms on 26 federal reclamation projects. Large portion of these are in arrears with their payments because of low prices and severe drought of last two years.

Opportunities for spring profit in sprinkler work. By Clarence E. Baker. Domestic Engineering. v.138, no.6. March 19, 1932. p.24-27. Discussion of typical installation on fifty-acre truck farm.

Successful method of operating lemons under overhead irrigation. By William H. Seeley. California Citrograph. v.17, no.1 November, 1931. p.34.

Land.

Faith in the land. By Elbert S. Brigham. Country Gentleman. v.12, no.5. May, 1932. p.10,64.

Land utilization and taxes: Editorial. Montana Farmer. v.19, no.16. April 15, 1932. p.6. One of great needs in order to make progress toward sound land utilization is to bring about coordination rather than competition between federal and state taxation systems.

Land utilization in Laurel County, Ky. By C. F. Clayton and W. D. Nicholls. U. S. Department of Agriculture. Technical Bulletin No. 289. 1932. 100p.

## Land. (Cont'd.)

Use of power outfit to clear land cuts the cost. By R. N. Miller.  
Washington Farmer. v.66, no.16. April 21, 1932. p.3,12.  
Forced draft stump burner combined with newly designed power pullers  
make possible rapid clearing of land by farmers of limited means.

## Lubrication.

Oil specification difficulties. By K. A. Newman. Power Plant  
Engineering. v.36, no.9. May 1, 1932. p.379-380. No  
specifications, however inclusive, have been able to guarantee  
quality because that intangible quality "oiliness, or lubricating  
ability" cannot be embodied in specifications. Oil specifications  
state physical properties of oil, not its lubricating ability,  
such specifications being usually treated by analyzing some oil  
which has been successful on job. Physical properties usually  
referred to are: 1, viscosity; 2, flash point; 3, fire point;  
4, cold test or pour test. These factors look well on laboratory  
report but do not indicate lubricating value of oil, nor do they  
insure satisfactory performance.

## Miscellaneous.

Annual report. 1931. Massachusetts Agricultural Experiment  
Station Bulletin 280. 1932. 250p. Investigation of apple  
storage; fertilizer distributors; test of low-lift pumps. p.195.

Attitudes on engineering and social progress: Editorial. Agri-  
cultural Engineering. v.13, no.4. April, 1932. p.113.  
General relationship of engineering to social progress, and its  
implied obligations, seem to apply specifically to agricultural  
engineering and agricultural progress. It is something for each  
agricultural engineering student and each agricultural engineer to  
consider in planning his further development and activities in the  
profession.

Automobile operating cost and mileage studies. By Robley Winfrey.  
1931. 56p. Iowa Engineering Experiment Station. Bulletin  
No. 106.

Back to the land: Editorial. Engineering News Record. v.108,  
no.18. May 5, 1932. p.639. Practical test of usefulness  
by engineers in Cleveland. Unemployed members of engineering  
profession are to be provided with a acre of land and shelter. Work-  
ing in groups under direction of experienced agriculturist, they  
will cultivate truck gardens, raising crops for their own use or  
for barter. Commissary is to be set up to feed men, to supply  
tools and other necessities and to dispose of farm products.

Miscellaneous.

(Cont'd.)

Engineering services in running lines or laying out drainage system for neighboring farmers also will be undertaken. More detailed description, p.665.

Costs and profits: Editorial. Farm Implement News. v.53, no.17. April 28, 1932. p.10-11. Society pays dearly for cut prices that lead ultimately to destruction of capital and jobs that it provides.

Engineer registration laws; their status at the present time. By Blake R. VanLeer. Mechanical Engineering. v.54, no.5. May, 1932. p.320-322, 375. Table gives by states registration of engineers and registration-law requirements.

Engineering just emerging from its infancy. By Terry Mitchell. Southern Power Journal. v.50, no.5. May, 1932. p.26-28. Only in recent years has organized research been thought worth while by most manufacturers. Industrial firms have just begun to give merited support to work of engineering societies, government stations, colleges and individuals with scientific insight. Deliberate striving for new things now brings us more improvements in ten years than was achieved in century of haphazard discovery. Engineering education, excellent trade publications in every technical field, industrial advertising, and many other influences are now at work, bringing to constantly greater usefulness powers of electricity, chemistry, steam and machinery. Proper attention is being directed toward problems of man power and humanization of industry.

Field experiments in horticulture. By T. N. Hoblyn. 1931. 50p. Imperial Bureau of Fruit Production. Technical Communication No. 2.

Fundamental error in theory of viscosity. By B. F. Groat. 1932. p.379-383. Reprint from Journal of Engineering Education. v.22, no.5. January, 1932.

George Washington, agricultural engineer. By Prof. E. W. Lehmann. Better Farm Equipment and Methods. v.4, no.9. May, 1932. p.6-7, 33-34.

Handbook of formulas and tables for engineers. By Clarence A. Peirce, Walter B. Carver and Chas. E. O'Rourke. 3d ed. N.Y., McGraw-Hill Book Company, Inc. 1929 228p.

Miscellaneous.

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- Handbook of industrial electricity: reference book for electricians, foremen, inspectors and contractors. By Max Kushlan. N.Y., McGraw-Hill Book Company, Inc. 1931. 535p.
- Is research efficient? By Richard F. Wilder. Factory and Industrial Management. v.83, no.2. February, 1932. p.53-55.
- Is wisdom an asset?: Editorial. Engineering News Record. v.108, no.18. May 5, 1932. p.639-640. Discussion of compulsory retirement of all government officials who have reached age limit.
- Lightning arrester grounds. By H. M. Towne. Pt.II. General Electric Review. v.35, no.4. April, 1932. p.215-221. Driving ground electrodes and making connections thereto. Artificial treatment of soil energy dissipation in soil. Impulse characteristics. Resistance values.
- Monthly and annual production of electricity for public use in the United States in 1931. Compiled by Division of Power Resources. April 29, 1932. 15p. Multigraphed U. S. Geological Survey.
- New set of standard engineering symbols. Engineering News Record. v.108, no.15. April 14, 1932. p.545. Approved by American Standards Association.
- On the trail of the forty-niners. Popular Mechanics. v.57, no.1. January, 1932. p.52-57. Two years' canal survey across Nicaragua.
- "Required reading": Three surveys of the existing economic disorder. By Ralph E. Flanders. Mechanical Engineering. v.54, no.5. May, 1932. p.317-319. Discussion of "Pathways back to Prosperity" by Charles Whiting Baker, "Paradox of Plenty" by Harper Leech, and "Jobs, Machines, and Capitalism" by Arthur Dahlberg.
- Revisions and addenda to the boiler construction code. Mechanical Engineering. v.54, no.5. May, 1932. p.370-375.
- Safe use and storage of gasoline and kerosene on the farm. 1932. 14p. U. S. Department of Agriculture. Farmers' Bulletin No. 1678.

Miscellaneous.

(Cont'd.)

Selecting multiple V-belts to suit the drive. Power. v.75, no.16. April 19, 1932. p.573-577. Even though V-belt drives may be among simplest of mechanical power-transmission equipment, proper understanding of their construction, how they operate and their characteristics is necessary if engineers are to obtain maximum service from them. These features have been treated in this article and design worked out of multiple V-belt drive to illustrate good practice when selecting these drives.

Soviet wheat: First-hand facts on that Russian menace. By Hickman Price, Jr. Country Gentleman. v.102, no.2. February, 1932. p.12-13, 39.

Tape used on drawing board instead of thumbtacks. Popular Mechanics. v.57, no.3. March, 1932. p.441. Made of material similar to cellophane, with one side coated with adhesive compound which grips both paper and wood surfaces firmly, yet can be stripped from either without leaving mark. Tape may be used repeatedly.

Water wells standards. 1931. 13p. Texas Department of Health.

Pipes.

Design for casing pipe for pipe undercrossings. By M. G. Spangler. Engineering News Record. v.108, no.16. April 21, 1932. p.580-581. Calculation and tabulation of shell thicknesses based on Marston's conduit-load theory and Boussinesq law of concentrated-load distribution.

Economy in wider use of protective coatings on pipes. By William Thompson Smith. Engineering News Record. v.108, no.16. April 21, 1932. p.576-578. Correlation of factors developing from system of soil studies to determine by chemical analysis where protection against corrosion should be provided along route of projected pipe line. Postponing application of protective coating until corrosion develops found to be uneconomical in most instances.

Potatoes.

King spud holds his own. Northwest Farm Equipment Journal. v.46, no.4. April, 1932. p.27-28.

Market diseases of fruits and vegetables: Potatoes. By George K. K. Link and Glen B. Ramsey. 1932. 62p. U. S. Department of Agriculture. Miscellaneous Publication No. 98.

## Poultry.

Handy mash feeder for chicks. By Ira J. Hollar. Farm and Ranch.  
v.51, no.7. April 1, 1932. p.20.

Poultry sanitation program for Missouri. By Berley Winton. 1932.  
12p. Missouri College of Agriculture. Agricultural Extension  
Service Circular No. 283.

## Poultry houses.

This warm brooder develops sturdy chicks. Popular Mechanics.  
v.57, no.3. March, 1932. p.481. Double-wall construction.

## Pumps.

Economics of deep-well pumping equipment. By F. G. Gordon. En-  
gineering News Record. v.108, no.17. April 28, 1932.  
p.620-621. Although of low efficiency, air lift has no moving  
parts below water and can operate in crooked wells. Plunger and  
turbine pumps operate in plumb wells and require more maintenance  
but give much higher efficiencies than air lift.

Electrically driven water pumps are easy to install. By E. R.  
Meacham. Electricity on the farm. v.5, no.4. April, 1932.  
p.8-12, 21.

Saving pumping costs by pressure adjustment. By Myron B. Reynolds.  
Engineering News Record. v.108, no.17. April 28, 1932.  
p.628-629.

## Reclamation.

Millions wasted on reclamation and power projects. Farm and Ranch.  
v.51, no.7. April 1, 1932. p.16-17. Federal government  
should leave all economic activities to private enterprise.

Power development on federal reclamation projects. By L. N. McClellan  
Reclamation Era. v.23, no.5. May, 1932. p.90-91. Boise  
project plants; Lingle and Guernsey plants; Plant at Shoshone Dam.

Summary of session laws of Colorado, 1931, of interest from viewpoint  
of federal reclamation. By Armand Offutt. Reclamation Era.  
v.23, no.5. May, 1932. p.92-93.

## Refrigeration.

Electric refrigeration. Merchandising Supplement to Electricity on the Farm. v.5, no.4. April, 1932. p.S4-S8. Electrification increasing; makes low rate available; improves farm products; refrigeration education; comparative test; published data available.

50 years development in refrigerating and ice making machinery.

By Terry Mitchell. Refrigerating World. v.67, no.4. April, 1932. p.8-12; Refrigerating Engineering. v.23, no.4. April, 1932. p.234-235.

Refrigeration in the handling, processing, and storing of milk and milk products. By John T. Bowen. U. S. Department of Agriculture. Miscellaneous Publication No. 138. 1932. 58p.

Refrigerator car surface temperatures. By W. J. Hukill. Refrigerating Engineering. v.23, no.4. April, 1932. p.225-233, 235, 242, 246, 250, 252, 259.

## Roofs.

Bakelite is used for roofing in place of heavy tile. Popular Mechanics. v.57, no.1. January, 1932. p.87. Bakelite, which is waterproof and weighs ninety per cent less than tile, cement and concrete materials, is being used for roofing purposes. Light lumber may be used for roof beams, resulting in savings in construction cost.

New roofs and walls make old homes young. By Llewellyn Price. Better Homes and Gardens. v.10, no.3. November, 1931. p.13-15, 63.

Roofs! Pencil Points. v.13, no.4. April, 1932. p.251-264.

Thin concrete shells for domes and barrel-vault roofs. Engineering News Record. v.108, no.15. April 14, 1932. p.537-538. Design known as Zeiss-Dywidag system in Europe to be introduced in this country. Basic feature is substitution of beam action for arch action.

Tile roofs and brick walls. By Rodney Moncure. Country Gentleman. v.12, no.5. May, 1932. p.9.

## Sewage and sewage disposal.

Re-use of sewage for domestic purposes. By Chester A. Smith. Municipal Sanitation. v.3, no.5. May, 1932. p.195. In Ruhr River watershed in Germany, water is recovered after passing through gravel beds. Results at Grand Canyon.

## Silos.

Our dryland farm silo is profitable. By Peter Bokma. Montana Farmer. v.19, no.16. April 15, 1932. p.3. Affords inexpensive but durable and attractive storage for feed.

Trench silo in New Mexico. Extension Service Review. v.3, no.4. April, 1932. p.56. Estimates of cost of these operations were very small and included chiefly labor of farmer himself.

## Soils.

Effect of air drying on the hydrogen ion concentration of the soils of the United States and Canada. By Ernest H. Bailey. 1932. 44p. U. S. Department of Agriculture. Technical Bulletin No.291.

Moisture penetration studies. By Marston H. Kimball. California Cultivator. v.78, no.13. p.291,302-303. To sum up remarks on moisture penetration we find there are several factors involved. Some are natural, (soil variation) and some are artificial (Too long irrigation furrows and hard layers produced by too much or too wet cultivation or both). Soil variation can be partly if not entirely overcome by adjustment of pipe lines and by spot irrigation. Over-long water runs can be overcome by more cross pipe lines. Cultivation-formed hard layers can be eliminated by less enthusiastic cultivation, by waiting until soil is dryer before working it, and by using same furrows for several irrigations, thus permitting soil to crack. Winter cover crops will be found material assistance.

Soil conservation, a major problem in agricultural readjustment. By Henry G. Knight. 1931. 8p. mimeographed.

## Spraying and dusting.

Control of the bean beetle in New Mexico. By J. R. Douglass. New Mexico Agricultural Experiment Station. Bulletin No. 199. 1932. 14p. Dusting and spraying machines that are equipped with booms and nozzles specially built to apply poison to under sides of leaves are necessary for proper application. Illustrations.

## Steam.

Insuring accuracy of steam-flow meter readings. By M. F. Knoy. Power. v.75, no.18. May 3, 1932. p.654-655.

Steam research in Europe and in America - II. Mechanical Engineering. v.54, no.5. May, 1932. p.356-359.

## Terracing.

Building terraces at low cost. By L. G. Samsel. Farm Implement News. v.53, no.15. April 14, 1932. p.14-15. 75 per cent of all cultivated land in the U.S. is suffering from soil erosion to some degree. Simple, broad-based Mangum or similar Nichols terrace will solve erosion problems under most field conditions. Land sloping as much as 5 or 6 feet per 100 feet can be terraced at surprisingly low cost with cylinder type or wheatland disk plow.

County terracing program. Extension Service Review. v.3, no.4. April, 1932. p.58. Following plan is being carried out in Lafayette County, Missouri in 1932. Preliminary three-day canvass of county was made in January to determine if sentiment was sufficient to warrant plan. Publicity for canvass was begun in November, 1931. Plan of work is to hold 10 meetings during year, devoting three days to each meeting. All interested are invited to attend during as many days as they care to. From among those reached during preliminary canvass and those attending first day three men who are willing to lead in work will be chosen, and three days' effort will be confined to three farms represented. In accepting leadership these men will agree to follow instructions, to pool and obtain necessary equipment, to help one another, to help others in their communities on any cooperative basis that is mutually agreeable, and to report their terracing activity to county agent. County agent will devote additional ten days during year to follow-up work to help local leaders with particular problems and to check up on local effort.

Low cost terrace building. By L. G. Samsel. Better Farm Equipment and Methods. v.4, no.9. May, 1932. p.8,32. Wheatland disc plow proves practical in soil erosion control.

Texas aids terracing. By Dan Scoates. Country Gentleman. v.102, no.5. May, 1932. p.24. Results of work on forty-two farms in Madison County on which terraces were built by use of county machinery showed that 1733 acres of land were terraced for \$906.05. This makes average cost of approximately fifty-three cents an acre. Terraces built had fall of three inches per hundred feet and were regulation size Mangum terraces, which are from twenty-two to twenty-four feet wide and twenty to twenty-four inches high. Terraces were built with three rounds of grader.

## Tractors.

Horses for tractors: Editorial. Farm Implement News. v.53, no.18.  
May 5, 1932. p.12.

How long will a tractor last?: Editorial. Tractor Farming. v.17,  
no.3 and 4. March-April 1932. p.16-17. More than 17 years.

Sears bids for farm trade with new tractor. Printers' Ink. v.158,  
no.2. January 14, 1932, p.48. Retail stores in Chicago  
zone offering list unit in power farming field. Tractor to be  
listed in, but not sold through, catalog.

Study of tractor trade possibilities: 80-acre class of corn belt and  
eastern farms offers best opportunity for immediate volume. Farm  
Implement News. v.53, no.15. April 14, 1932. p.12-13.  
Table gives Illinois tractor census, April 1, 1930, by counties,  
with record of crop acres per tractor in each county.

Tractor and horse costs compared. By Donald Jones. Tractor  
Farming. v.17, no. 3 and 4. March-April, 1932. p.4-5, 22.  
Cheaper power is by no means only advantage of tractor. Saving  
of man labor is often of far greater value to farmer.

Tractor that digs up trees aids nursery harvest. Popular Mechanics.  
v.57, no.3. March, 1932. p.359. Trees up to twenty feet  
high are dug. Tractor straddles row of trees, much like potato  
digger, and penetrates soil to depth of sixteen inches. Blade  
cuts swath twenty-four inches wide and is quickly raised or lowered  
with little effort.

Working the tractor double shift. By Clarence E. Johnson. Montana  
Farmer. v.19, no.16. April 15, 1932. p.5. Cost of equip-  
ment can be kept down to lowest figure possible by keeping it going  
night and day during busy season.

## Water.

Appropriation slash will interrupt study of water resources. En-  
gineering News Record. v.108, no.16. April 21, 1932.  
p.579-580. Government will not match state cooperative funds.  
Extensive curtailment of stream gagings, flood and runoff measure-  
ment will be necessary. Power, water supply, sanitation and flood  
protection are dependent on continuous records. Editorial,  
p.568.

Water. (Cont'd.)

Ground-water resources of Florida. By D. G. Thompson and V. T. Stringfield. 1931. 18p. Florida Geological Survey Press Bulletin No. 13.

Lessons in water conservation from recent heavy rains. By Dr. W. C. Lowdermilk, California Cultivator. v.78, no.13. March 26, 1932. p.293. Requirements for maximum conservation of storm waters in Southern California consist of following major factors: 1. Complete mantles of vegetation on mountain slopes; 2. Check dams in channels; 3. More flood control dams to regulate storm flow; 4. Development of spreading works for effective spreading of storm flow; 5. Maintenance of spreading grounds in a cover of vegetation, chaparral or sage to facilitate percolation.

Report of addresses given at Third National Water Users Conference. Salt Lake City, Utah. February 10, 1932.

Snow records in California indicate good water year: survey of snow depth and water content show that much more water is held back in this form of storage than in former years. Engineering News Record. v.108, no.15. April 14, 1932. p.559.

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